



RESEARCH ACTIVITIES

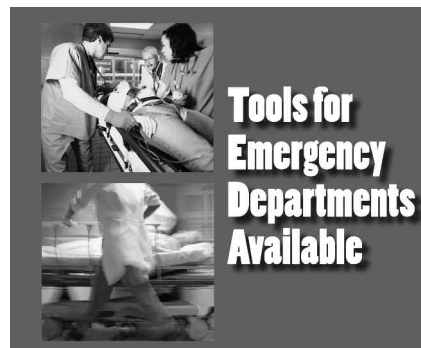
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Hospital emergency departments get tips from AHRQ on how to reduce crowding and better triage patients

Crowding at emergency departments (EDs) in the United States, a problem for many years, has become a huge problem. The number of annual ED visits in the United States grew from 90.3 million in 1996 to 119.2 million in 2006, according to the Centers for Disease Control and Prevention. At the same time, the number of U.S. hospitals with operating EDs shrank from 4,019 in 1991 to 3,833 in 2006. Nearly half of EDs report operating at or above capacity,

according to a new guide to reduce ED crowding from the Agency for Healthcare Research and Quality (AHRQ).

Further complicating matters, 9 of 10 hospitals report holding or “boarding” admitted patients in the ED while they wait for increasingly scarce inpatient beds. With long ED wait times, many patients end up frustrated, with about 2 percent leaving without being seen—a risky move for some.



Emergency Department Crowding: A Guide for Hospitals, helps hospitals plan and implement strategies to improve patient flow. In addition, an updated, newly released edition of AHRQ’s *Emergency Severity Index: A Triage Tool for Emergency Department Care, Version 4, Implementation Handbook*, supports rapid and accurate triage of ED patients. This, in turn, helps reduce crowding.

Hospitals know that ED crowding diminishes care quality, is costly, and compromises community trust. And soon, how they manage ED crowding will affect reimbursement for ED care. In 2013, hospitals will begin reporting ED crowding measures to the Centers for Medicare & Medicaid Services. These measures—for example, median time from ED arrival to ED

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Hospitals know ED crowding is a problem, but they don't know the solution.

“I think the hospital ED situation is chaotic right now,” says Bruce Siegel, M.D., M.P.H., President and CEO of the National Association of Public Hospitals and Health Systems. “Hospitals know ED crowding is a problem, but they don’t know the solution. There are a lot of ideas out there for how to reduce ED crowding—a little bit of snake oil sometimes—and AHRQ can play a huge role in getting the evidence base for strategies to improve ED flow and spread right practices.”

AHRQ’s new guide, *Improving Patient Flow and Reducing*

From the Director



Hospital emergency departments (EDs) are where life-and-death decisions are made every day.

Communities and patients rely on them to save lives. But the crisis of hospital ED crowding threatens patient safety and community trust. AHRQ's guide to reducing ED crowding can help hospitals identify and implement strategies to improve ED patient flow and reduce crowding.

AHRQ's updated Emergency Severity Index (ESI) handbook also helps improve ED patient care by

providing a standardized way to triage patients accurately and quickly. Deciding which patients get treated first is the critical task of the triage nurse. Within a few minutes, the nurse must size up how severely ill or injured a patient is and get him to the right place for care, whether it is a fast-track area for less ill patients or an ED bed for immediate lifesaving interventions.

The ESI helps nurses make accurate assessments of the right level of care a patient needs. Overall, the 5-level ESI triage system helps get the patient to the right resources in the right place at the right time.

The updated ESI handbook includes a new chapter on triaging

children. This section will be particularly helpful for triage nurses at general hospitals, who do not see children as often as those in children's hospitals.

AHRQ has invested in research on emergency department care for many years and is committed to advancing the evidence base to improve ED safety, quality, and efficiency of care. These two important new tools will help hospitals improve the care they provide to patients in communities across America every day.

Carolyn Clancy, M.D.

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Emergency department crowding

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departure, door-to-diagnostic evaluation by a qualified medical professional, and number of patients who leave before being seen—could affect hospital reimbursements for ED care.

Studies show that reducing ED crowding can improve care quality. An AHRQ-supported study reported in September's *Research Activities* (www.ahrq.gov/research/sep11/0911RA24.htm) found that children seen for acute asthma at a crowded ED (75th percentile of a crowding measure) were 52 to 74 percent less likely to receive timely care and 9 to 14 percent less likely to receive effective care than those at less crowded EDs (25th percentile of the crowding measure).

Guide to improving ED patient flow

Improving Patient Flow and Reducing Emergency Department Crowding: A Guide for Hospitals provides step-by-step instructions for planning and implementing strategies that can improve patient flow through EDs based on individual hospital situations. "For example, we encourage hospitals to identify the most likely causes of the gridlock they face and consider the human and financial resources available, then think realistically about the type of strategies they can afford to implement and maintain," says Megan McHugh, Ph.D., of Northwestern University, one of the AHRQ contractors that helped to develop the guide. The guide contains real-world examples of how hospitals have implemented these steps, the pitfalls they encountered, and strategies used to overcome them.

Hospitals realize they don't have any more money to buy beds or build bigger emergency rooms, and they have to get better at patient flow.

"Hospitals realize they don't have any more money to buy beds or build bigger emergency rooms, and they have to get better at patient flow," notes Dr. Siegel, who led an initial Urgent Matters Learning Collaborative from 2002 to 2008 sponsored by the Robert Wood Johnson Foundation (RWJF) to help hospitals identify and test patient flow strategies. Four of six hospitals that participated in a second RWJF-funded learning collaborative modestly reduced ED length of stay or the proportion of patients who left without being seen, according to a recent AHRQ-funded study. The hospitals implemented one or more strategies—some of which grew out of the first collaborative. Led by Dr. McHugh and a team of researchers from the Health Research and Educational Trust, the study found that the improvement strategies hospitals chose and their impacts varied considerably.

For example, one hospital reduced ED stays by 51 minutes by implementing front-end improvements (such as a more efficient intake process for nonurgent patients) and devoting additional staffing resources (such as more nurse practitioners and beds) for fast-track patients who are not very sick. Another hospital that implemented only front-end improvements had a 9-minute

reduction in time spent in the ED. A third hospital reduced by 33 percent (from 0.6 percent to 0.4 percent) the patients who left without being seen by improving communication between the ED and inpatient units to facilitate hospital admissions. For example, they instituted a daily phone call with bed coordinators to discuss occupancy rates and transfer needs. A fourth hospital reduced ED stays by nearly 1 hour for mid-acuity patients by establishing a new expedited care process for them.

Dr. McHugh notes, "There may be many effective strategies for improving patient flow, but more research is needed to determine which strategies work best in different settings." AHRQ's guide is a first step in that direction.

Updated handbook for triaging patients

Improving triage is one strategy for enhancing overall ED flow. To help EDs improve triage of patients, AHRQ recently released a fourth version of its handbook on the Emergency Severity Index (ESI). The update includes a new pediatrics chapter and case studies that nurses can use to practice triage decisions with the ESI. The triage tool stratifies patients into five groups from 1 (most urgent) to 5 (least urgent) based on their severity of illness and need for resources such as tests or treatments. This approach accurately identifies patients who need to be seen immediately and those who can safely wait to be seen. Severity is determined by stability of vital functions and potential for life, limb, or organ threat.

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A recent study by Dr. McHugh and colleagues (December 2011 *Academic Emergency Medicine*) based on a 2009 American Hospital Association survey found that 72 percent of hospital EDs are using the ESI triage tool and only 13 percent are using the 3-step triage tools, which were the dominant type of triage scale 30 years ago.

“I’m not surprised,” says Kendall Hall, M.D., an emergency physician and medical officer in AHRQ’s Center for Quality Improvement and Patient Safety. “The ESI is a validated tool and gaining momentum as a way to standardize the triage process in EDs. I think people see the value in it,” she says. “What’s great about the system is the high interrater reliability. With other systems, there can be a lot of variability in the triaging of patients across nurses. Just having a standardized way of triaging—where a patient with a certain presentation will be consistently triaged at a certain level—makes this system safer for the patients.”

The ESI is a validated tool and gaining momentum as a way to standardize the triage process in EDs.

ESI level-1 patients, who require immediate life-saving care, comprise between 1 percent and 3 percent of all ED patients. A few examples of ESI level-1 patients are those with cardiac or respiratory arrest; an unresponsive, critically injured trauma patient; a flaccid baby; and a person in anaphylactic shock. ESI level-2 patients, who have a potential major life or organ threat, comprise 20 percent to 30

percent of ED patients. They are high-risk patients the triage nurse determines should not wait for care. Examples include patients with suspected heart attack, a suicidal or homicidal patient, and a hemodynamically stable woman who may have an ectopic pregnancy. Half or more of these patients are admitted to the hospital from the ED.

If patients don’t fall into the first two categories, the triage nurse considers what resources, such as lab tests, the patient might need. Based on vital signs, history of present illness, nurses’ clinical judgments, and factors such as medications, past medical history, and pain level, the triage nurse upgrades the patient to level 2 or assigns them to level 3, 4, or 5.

Historically, EDs used three-level triage systems (e.g., emergent/urgent/non-urgent), but research showed a lack of reliability and validity with these triage systems. Stratifying patients into five levels instead of three has helped considerably, says Debbie Travers, Ph.D., R.N., assistant professor of the University of North Carolina School of Nursing. She helped develop the ESI and worked with AHRQ to complete the latest update.

Dr. Travers explained to *Research Activities* that patients who have simple problems, such as needing a prescription to treat poison ivy, are level 5, and those who just need one straightforward intervention, for example, patients with an ankle sprain who need an x-ray, are a level 4. The complicated, but stable patients are rated level 3. An example is an elderly person with multiple medical problems who comes in with dizziness, which could be caused by many things.

“This patient would require an involved workup to figure out what’s causing the dizziness,” says Dr. Travers. “These level-3 patients are going to be in the ED for a longer time.”

New evidence from a study on pediatric triage by Dr. Travers and colleagues, supported by the Health Resources and Services Administration, formed the foundation for the new ESI pediatric chapter. That chapter details different triage levels based on, among other things, a child’s temperature – whether there is a source for the fever, vaccination history, etc.

The pediatric information in the new ESI handbook was added at the request of practicing ED nurses. Says Dr. Travers, “In our study, we found that nurses at children’s hospitals are most experienced with pediatric triage. But general hospital EDs that only see children occasionally don’t see a high enough volume of pediatric cases to feel comfortable with pediatric triage. They love the new pediatric chapter, because there’s a lot of information in there to help them.”

The ESI may also help in addressing issues related to ED crowding, notes Dr. Travers. For example, the ESI provides standardized, reproducible information about patient acuity to assist with ED operations, such as the differing approaches to treating level 4 and 5 patients versus the level 1 to 3 patients. She points out that most EDs have some kind of fast-track area for less sick patients, so they don’t have to wait a long time while the very sick patients are being seen. The 1 and 2 level

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patients are treated in the main ED and go into an ED bed the soonest.

“Getting the patient to the right place is one of the most important pieces of the emergency care puzzle,” says AHRQ’s Dr. Hall. “Before [ESI] there was a lot of variation in practice. Patients may have ended up in the wrong place

Getting the patient to the right place is one of the most important pieces of the emergency care puzzle.

or not getting the care they needed or getting it too late.” ■ *GSM*

Editor’s Note: The guide on reducing ED crowding and updated

ESI handbook can be found at www.ahrq.gov/qual/edtools.htm. An AHRQ ESI training video can be obtained from AHRQ by calling 1-800-358-9295 or sending an email to AHRQPubs@ahrq.hhs.gov. The ESI is one tool in the Door-to-Doc toolkit designed to improve ED flow, which can also be found at www.ahrq.gov/qual/edtools.htm.

Patient Safety and Quality

Learning networks can help implement strategies to improve emergency department patient flow

Many emergency departments (EDs) are operating at or above capacity, which can negatively impact care quality. In response, hospitals have implemented strategies to improve patient flow and reduce ED crowding. A new study identifies the facilitators and barriers encountered by six hospitals that implemented various strategies to improve patient flow. It found that participation in a learning network and strategic selection of improvement team members facilitated implementation. Other facilitators included executive support and the availability of resources; staff-driven improvement strategies; an aligned reporting structure; implementation of simple process changes; and a flexible and robust information technology system.

Factors impeding implementation included staff resistance and entrenched organizational culture. Staff resistance most often occurred when process changes resulted in more work or a disruption in workflow, or because frontline staff were not included in the planning. Organizational resistance was more likely when a proposed change ran counter to the existing culture, note Dina Moss, M.P.A., of the Agency for Healthcare Research and Quality, and coinvestigators.

Some of the challenges were mitigated through approaches such as staff education and department leaders’ constant reinforcement.

All six of the hospitals were members of an 18-month Urgent Matters Learning Network that implemented a total of eight different strategies. The strategies were: protocols for specialty consults; advanced protocol for patients presenting with abdominal pain; standardized registration and triage process; 5-level triage; immediate bedding; fast-track improvement using dedicated beds for fast-track patients; mid-track process for mid-acuity patients; and ED/inpatient department communication improvement. The study’s findings were based on two rounds of interviews with members of hospital implementation teams, with a total of 129 interviews.

See “Facilitators and barriers to the implementation of patient flow improvement strategies,” by Kevin J. Van Dyke, M.P.P., Megan McHugh, Ph.D., Julie Yonek, M.P.H., and Ms. Moss, in the *Quality Management in Healthcare*, 20(3), pp. 223-233, 2011. Reprints (AHRQ Publication No. 12-R031) are available from AHRQ.* ■ *MWS*

Trauma patients with hospital-acquired infections have poor outcomes, including increased mortality risk

Among all hospital admissions, trauma patients are at especially high risk when it comes to developing hospital-acquired infections (HAIs). When these infections occur, they are a leading cause of death in these individuals. A new study found that trauma patients with HAIs have longer hospital stays, increased risk of dying, and higher inpatient costs.

The researchers examined the relationship between four different HAIs: sepsis, pneumonia, *Staphylococcus* infections, and *Clostridium difficile*-associated disease and three outcome measures: in-hospital mortality, length of hospital stay, and inpatient

costs. They analyzed the records on 155,891 trauma patients obtained from the 2005 and 2006 Nationwide Inpatient Sample.

All three outcome measures were significantly higher in patients with HAIs than in trauma patients without these infections. Patients with sepsis had the highest risk of dying in the hospital, with close to a sixfold higher odds of mortality compared to patients without HAIs. Among the other infections, there was a 1.5- to 1.9-fold higher odds of dying in the hospital. When costs were analyzed, patients with HAIs had health care expenditures 2- to 2.5-fold higher compared with non-infected patients. Those with HAIs

also stayed in the hospital twice as long as patients without HAIs. The researchers call for more patient safety initiatives to reduce HAIs and related poor outcomes in this patient population. The study was supported in part by the Agency for Healthcare Research and Quality (HS16737).

See “Increases in mortality, length of stay, and cost associated with hospital-acquired infections in trauma patients,” by Laurent G. Glance, M.D., Pat W. Stone, Ph.D., Dana B. Mukamel, Ph.D., and Andrew W. Dick, Ph.D., in the July 2011 *Archives of Surgery* 146(7), pp. 794-801. ■ KB

Hawaii's experience shows that a national collaborative effort can reduce central line-associated bloodstream infections

Central lines are catheters inserted into a vein and guided up into the heart where they deposit a medication, such as antibiotics, for infections and other conditions. Sometimes, these lines can become infected. The resulting bloodstream infections (BSI) may be quite severe and cause death. Preventing these infections is vitally important. Recently, intensive care units across the United States have joined in a collaborative effort to reduce central line-associated bloodstream infections by implementing a safety and intervention program. One study details its success in Hawaii, where infection rates declined considerably.

The national intervention is called “On the CUSP (Comprehensive Unit-Based Safety Program): Stop BSI.” It is implemented as a State-level collaborative structured around State hospital associations. In the intensive care unit (ICU), the intervention reminds providers to wash their hands, use chlorhexidine and full barrier precautions, and avoid using the femoral site when placing the line or cleaning it. Caregivers are also encouraged to ask every day if the line can be removed. A second level of the intervention focuses on educating staff, identifying defects, and working as a

team. Ultimately, the goal is to achieve a statewide mean BSI rate of less than 1 infection per 1,000 catheter days.

The Hawaii experience included 20 ICUs at 16 hospitals and 61,665 catheter days. Prior to the intervention, the overall mean BSI rate was 1.5 infections per 1,000 catheter days. Following the intervention at 16 to 18 months, this dropped to 0.6. This represented a 61 percent decline. Several lessons were learned from the Hawaii experience. First, implementing this intervention involves more than just using a checklist. Second, communication among hospitals must be effective and time-sensitive. Leaders are also important, as is recognizing those who are doing the work. The study was supported in part by the Agency for Healthcare Research and Quality (Contract No. 290-06-0022).

See “Eradicating central line-associated bloodstream infections statewide: The Hawaii experience,” by Della M. Lin, M.D., M.S., Kristina Weeks, M.H.S., Laura Bauer, M.P.H., and others in the September 14, 2011 *American Journal of Medical Quality* [Epub ahead of print]. ■ KB

Crisis checklists for the operating room can improve safety and management

With 234 million surgical operations performed annually worldwide, more than 3 million patients each year can suffer an adverse event in the operating room. Such crises require rapid, coordinated management in stressful, time-critical settings, relying largely on clinicians' knowledge and skill. Failure to adhere to critical steps in management of these crises is common and hazardous to patients. In a study simulating the most common and life-threatening operating room crises, checklist use resulted in a 6-fold reduction in failure to adhere to critical steps in management, suggesting their potential to improve operating room safety. This reduction was achieved using eight different scenarios with two pilot teams.

Checklists are tools that can improve standardization, teamwork, and overall performance in crisis situations. Checklists for routine perioperative use have been shown in multiple studies to substantially reduce death and complications, and are rapidly becoming established as the standard of care.

This project to aid surgical teams and their patients proceeded in two phases: checklist development and pilot testing of the checklists in a high-fidelity anesthesia simulator. The final product contained checklists for 10 crises: air embolism; anaphylaxis; unstable bradycardia; unstable tachycardia; cardiac arrest with no cardiac electrical activity; cardiac arrest with ventricular fibrillation; failed airway; fire; hemorrhage; and

malignant hyperthermia, hypotension, and hypoxia.

The researchers defined a set of evidence-based critical, lifesaving processes for each crisis, resulting in a total of 46 key processes across all scenarios considered essential to management of these crises. The participants rated the overall quality of the checklists and scenarios to be higher than average or excellent. This study was supported by the Agency for Healthcare Research and Quality (T32 HS18537).

See "Crisis checklists for the operating room: Development and pilot testing," by John E. Ziewacz, M.D., Alexander F. Arriaga, M.D., Angela M. Bader, M.D., and others in the *Journal of the American College of Surgery* 213, pp. 212-219, 2011. ■ MWS

Evaluation of TeamSTEPPS® implementation finds improved teamwork and clinical outcomes

The TeamSTEPPS® system, an evidence-based teamwork system that was developed specifically for health care professionals to improve patient safety, focuses on four core areas of competency: team leadership, situation monitoring, mutual support, and communication. A customized 2.5-hour version of TeamSTEPPS® was used to train medical, nursing, and respiratory therapy staffs in both the pediatric intensive care unit (PICU) and the surgical intensive care unit (SICU) of an academic medical center. This training consisted of more than 40 group training sessions, with 5 to 10 participants each, during an 8-week period. Teamwork and patient outcomes improved 1 and 12 months after implementation.

Based on interview data, the implementation was perceived positively by participating staff. Also, data from several surveys indicated improvements in staff perceptions of teamwork and communication openness in both the PICU and SICU. Two of the three measured clinical outcomes improved during the study period. The average time for placing patients on extracorporeal

membrane oxygenation declined significantly after 12 months. The percentage of hospital-acquired infections for both the SICU and PICU was lower than the 2009 upper control limit for 7 of the 8 post-implementation months. However, there was no significant difference in the mean response time for the adult surgery and pediatric rapid response team from pre- to post-implementation.

The researchers believe that their implementation approach demonstrates the effectiveness of using the TeamSTEPPS® action planning steps and educational materials as the basis for a streamlined training program. This study was supported in part by the Agency for Healthcare Research and Quality (Contract No. 290-06-00071).

See "Evaluating efforts to optimize TeamSTEPPS implementation in surgical and pediatric intensive care units," by Celeste M. Mayer, Ph.D., Laurie Cluff, Ph.D., Wei-Ting Lin, Ph.D., and others in the August 2011 *Joint Commission Journal on Quality and Patient Safety* 37(8), pp. 365-374. ■ MWS

Guideline management of inpatient cellulitis and cutaneous abscess reduces antibiotic use

Since 1999, there has been a dramatic rise in the number of cellulitis and cutaneous abscess infections in the United States. These infections account for nearly 600,000 hospital admissions each year. A recent study has detailed how a health care system in Denver, CO, developed and implemented a clinical practice guideline to standardize and streamline the management of these infections. Use of the guideline resulted in several improvements, including reduced antibiotic use and less frequent use of unnecessary microbiological studies.

The guideline recommended selective rather than routine use of several diagnostic tests. In terms of antibiotics, intravenous vancomycin was suggested, while use of agents with a broad spectrum of gram-negative or anaerobic activity were discouraged. A 7-day course of

therapy was recommended for patients responding to treatment. Once developed, the guideline was sent to all clinicians via electronic mail and available on the intranet. Hard copies were also posted in work areas and nursing stations. A standardized computerized provider order entry admission order set was created. An educational campaign reinforced use of the guideline by way of assigning physician peer champions to deliver key messages. Finally, during the 12-month intervention period, quarterly audits were undertaken to determine how well the guideline was being used with feedback to peer champions.

After one year, the use of microbiological cultures declined from 80 percent before the intervention to 66 percent after implementation. In addition, requests for inpatient consultation declined from 46 percent to 30

percent. The guideline was successful in discouraging the use of agents with broad-spectrum gram-negative activity, which declined from 66 percent to 36 percent, and anaerobic activity, which declined from 76 percent to 49 percent. The median duration of therapy decreased from 13 days to 10 days with the intervention. The incidence of adverse clinical outcomes was similar before and after implementation of the guideline. The study was supported in part by the Agency for Healthcare Research and Quality (HS17526).

See “Decreased antibiotic utilization after implementation of a guideline for inpatient cellulitis and cutaneous abscess,” by Timothy C. Jenkins, M.D., Bryan C. Knepper, M.P.H., M.Sc., Allison L. Sabel, M.D., Ph.D., M.P.H., and others in the *Archives of Internal Medicine* 171(12), pp. 1072-1079, 2011. ■ KB

Emergency Care

EMS transport is underused by patients with a certain type of heart attack

The quicker that patients with a particular kind of heart attack known as ST-segment-elevation myocardial infarction (STEMI) get to the hospital and receive balloon angioplasty to open up blocked arteries, the more likely they are to have better outcomes. Patients transported to the hospital by emergency medical services (EMS) had significantly shorter delays than self-transported individuals between symptom onset and hospital arrival (median 89 versus 120 minutes) and door-to-balloon time (63 versus 76 minutes), found a new study.

Researchers compared patients transported by EMS to those who self-transported to the emergency department among 37,634 STEMI patients. Only 60 percent of the patients used EMS to get to the hospital. Patients who used EMS were more likely to be older and female. They were also more likely to have other medical conditions, to be sicker on presentation, and to live farther from the hospital. Patients who did not use

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EMS transport

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EMS were likely to be younger, male, Hispanic, and live closer to the hospital.

Patients who self-transported had significantly longer delays to hospital arrival after symptom onset and experienced significant delays to STEMI care and reperfusion with angioplasty. The researchers conclude that EMS transport to the hospital remains underused

among STEMI patients and that policy interventions to increase EMS use have the potential to decrease total time of reduced blood flow and save heart muscle. This study was supported in part by the Agency for Healthcare Research and Quality (HS16964).

See “Use of emergency medical service transport among patients with ST-segment-elevation myocardial infarction,” by Robin Mathews, M.D., Eric D. Peterson, M.D., Shuang Li, M.S., and others in *Circulation*, 124, pp. 154-163, 2011. ■ MWS

Study characterizes patients receiving out-of-hospital endotracheal intubation

Endotracheal intubation (ETI), a medical procedure in which a tube is placed through the mouth and into the windpipe (trachea), is a key procedure performed by paramedics in the United States. A new study sheds light on what medical conditions are associated with out-of-hospital paramedic ETI. Medical directors could use this information to prioritize airway management options and strategies for emergency medical services agencies. A team of researchers led by Henry E. Wang, M.D., of the University of Alabama at Birmingham linked 25,733

successful ETIs performed by paramedics in Pennsylvania during 2003-2005 to death or hospital records. More than half of the group (56.3 percent) died before hospital admission and 43.7 percent survived to hospital admission.

The majority of successful ETIs occurred on patients with cardiac arrest and circulatory and respiratory conditions. Among the 11,255 hospitalized patients who received out-of-hospital ETI, the leading primary diagnosis groups were circulatory diseases (32 percent), respiratory diseases (23

percent), and injury or poisoning (25 percent). Among the patients who had died prior to hospital admission, most (93 percent) suffered from nontraumatic cardiac arrest. This study was supported in part by the Agency for Healthcare Research and Quality (HS13628)

See “Medical conditions associated with out-of-hospital endotracheal intubation” by Dr. Wang, G.K. Balasubramani, Ph.D., Lawrence J. Cook, Ph.D., and others in the July/September 2011 *Prehospital Emergency Care* 15, pp. 338-346. ■ MWS

Health Care Costs and Financing

24-hour intensivist care in ICUs can lead to cost savings for the sickest patients admitted at night

Health care organizations such as the Society for Critical Care Medicine recommend that level-1 intensive care units (ICUs) be staffed with 24-hour in-house intensivists. Others, such as The Leapfrog Group, a consortium of major health care providers, recommend an on-demand care model in which intensivists are present during day hours (7AM to 7PM) and available by page at other times. Because the first few hours of intensive care are the most critical for many patients, the 24-hour model could particularly benefit the sickest patients admitted to the ICU at night. That's exactly what a new study found.

Researchers assessed the cost implications of substituting the 24-hour intensivist model for the on-demand model of intensivist care. The costs for the 24-hour intensivist model were 61 percent lower for the sickest patients admitted during night hours (7PM to 7AM). The finding of lower costs for the sickest patients when treated by 24-hour intensivists is consistent with these researchers' earlier findings of decreased ICU and total length of hospital stay for patients treated under the same model.

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Intensivists

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Among less-ill patients admitted at night or among patients admitted during the day, there were no significant changes in costs. The cost savings observed by the researchers of somewhat more than \$10,000 per patient among the sickest patients admitted at night suggest the potential for large savings for specific patients that are big enough to make this economically attractive for quite small ICUs. The study included patients admitted to the adult medical ICU at a large

academic hospital during 2005-2006. The sickest patients were those who were in the highest 25 percent as measured by the Acute Physiology and Chronic Health Evaluation III instrument. This study was supported in part by the Agency for Healthcare Research and Quality (HS16967).

See “Economic implications of nighttime attending intensivists coverage in a medical intensive care unit,” by Ritesh Banerjee, Ph.D., James M. Naessens, Sc.D., Edward G. Seferian, M.D., and others in *Critical Care Medicine* 39(6), pp. 1257-1262, 2011. ■ MWS

Costs of congenital heart operations vary among hospitals

Of all birth defects, congenital heart defects are associated with the highest average hospital charges, length of stay, and mortality. A team of researchers examined cost data from 20 U.S. hospitals for four congenital heart operations of varying levels of complexity. They examined the records of 2,124 patients up to 18 years of age undergoing congenital heart surgery from 2001 to 2007. As expected, total hospital costs rose with the increasing complexity of the operation from a median of \$12,761 for atrial septal defect repair to a median of \$55,430 for the arterial switch operation.

Accounting for various patient and center factors and length of stay, the

proportion of total cost variation explained by center decreased as the complexity of the surgery increased: 19 percent for atrial septal defect repair, 11 percent for ventricular septal defect repair, 6 percent for tetralogy of Fallot repair, and 3 percent for arterial switch operation. Cost differences between centers were most prominent for the lower complexity procedures. Higher surgical volume was associated with significantly lower hospital costs, but only for the less complex surgeries.

The researchers concluded that although higher complexity operations account for greater relative cost, there is greater variation across institutions for

lower complexity operations. Thus, initial efforts to reduce cost variation between centers may be best focused on lower complexity, common operations. The study was supported in part by the Agency for Healthcare Research and Quality (HS16957).

See “Center variation in hospital costs for patients undergoing congenital heart surgery,” by Sara K. Pasquali, M.D., Jie-Lena Sum, M.S., Phil D’Almada, M.S., and others in *Circulation and Cardiovascular Quality Outcomes* 4, p. 306-312, 2011. ■ MWS

Pneumococcal disease continues to lead to substantial health care use and costs

Despite the widespread use of vaccination for adults and children, *Streptococcus pneumoniae* (pneumococcus) remains a substantial cause of illness and death, concludes a new study. The bacteria causes localized disease such as acute otitis media (AOM, ear infections) and sinusitis, as well as serious infections such as pneumonia and meningitis. The study, based on 2004 data, offers a broad portrait of the impact of pneumococcus on health care use and costs. In that year, pneumococcus caused an estimated 4 million disease episodes. Over 3.5 million disease episodes were treated solely in outpatient settings, with AOM

and sinusitis responsible for 85 percent of outpatient cases (1.5 million cases each). Of the 445,000 pneumococcal-related hospitalizations, more than 90 percent were for pneumonia.

Health care use attributable to pneumococcal disease in its various forms included an estimated 5 million outpatient visits, 4.1 million outpatient antibiotic prescriptions, 774,000 emergency department visits, 445,000 hospitalizations, and 24,000 nursing home

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Pneumococcal disease

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stays. Overall, pneumococcal hospitalizations were responsible for 2.3 million hospital days.

Direct medical costs attributable to pneumococcal disease were estimated to be \$3.5 billion. Work loss costs added \$914 million and productivity costs due to death and disability added another \$3.1 billion. Conditions treated in the hospital were responsible for 76 percent (\$2.6 billion) of direct medical costs and 82

percent (\$6.3 billion) of total costs. Adults accounted for 83 percent (\$3 billion) of direct health care costs and 84 percent (\$6.5 billion) of total costs when work loss and productivity costs were included. This study was supported in part by the Agency for Healthcare Research and Quality (HS14563).

See “Healthcare utilization and cost of pneumococcal disease in the United States,” by Susan S. Huang, M.D., Kristen M. Johnson, G. Thomas Ray, M.B.A., and others in *Vaccine* 29, pp. 3398-3412, 2011. ■ *MWS*

Study provides rare look at patterns of use and spending for physical therapy

A new study of patterns of use and spending on adult physical therapy found that about three quarters of episodes were for musculoskeletal conditions, with an average number of visits per episode of 9.6, and average total payments from all sources (e.g., out-of-pocket, private insurance, etc.) of \$130 per visit. Controlling for characteristics of the patient and setting of care, women had 1.4 more visits per episode, on average, than men, and a similar differential (1.7 visits) was found between those with high blood pressure and those without the condition. Those with fair or poor mental health also had 1.7 more visits per episode than those with better mental health.

After controlling for other characteristics, expenses per visit

were about 27 percent higher for episodes treated primarily in hospital outpatient departments versus office settings. In addition, total payments per visit for episodes among non-elderly adults without private insurance were 20 to 33 percent lower than for episodes among those with private coverage. Expenses per visit were 12 percent lower for episodes associated with musculoskeletal conditions compared to episodes associated with other conditions (including stroke, Parkinson’s disease, and traumatic brain injury).

The study was conducted by Steven R. Machlin, M.S., William W. Yu, M.A., and Marc W. Zodet, M.S., of the Agency for Healthcare Research and Quality (AHRQ) along with J. Chevan, P.T., Ph.D.,

M.P.H., O.C.S., of Springfield College. It was based on data on 1,377 episodes of physical therapy from AHRQ’s Medical Expenditures Panel Survey, a national survey of health care utilization, costs, and sources of payment.

See “Determinants of utilization and expenditures for episodes of ambulatory physical therapy among adults,” by Mr. Machlin, Dr. Chevan, Mr. Yu, and Mr. Zodet, in *Physical Therapy* 91, pp. 1018-1027, 2011. Reprints (Publication No. 12-R074) are available from AHRQ.* ■ *MWS*

Note: Only items marked with a single (*) asterisk are available from the AHRQ Clearinghouse. See the back cover of *Research Activities* for ordering information. Consult a reference librarian for information on obtaining copies of articles not marked with an asterisk.

Patients with hepatitis C virus infection who adhere to their drug regimen are more likely to show long-term benefit

Less than optimal adherence by a patient infected with hepatitis C virus (HCV) to a regimen of pegylated interferon and ribavirin decreases the likelihood of finding no detectable viral load 24 weeks after the medication is stopped (a sustained viral response), according to a new study. The standard of care for HCV infection—twice-daily treatment with oral ribavirin and weekly subcutaneous injection of pegylated interferon 2a or 2b—can eradicate the virus, halt or regress liver fibrosis, and reduce the risks for cirrhosis of the liver, hepatic decompensation, and malignant liver cancer.

However, the treatment is complex and requires frequent laboratory monitoring of the viral response and possible adverse effects. The researchers found that patients infected with HCV genotypes 1 or 4 were more likely to have an early virologic response, a 100-fold reduction in viral load, over the initial 12 weeks of treatment with 91–100 percent adherence (63 percent of 2,187 patients). This contrasted with patients with 40 percent adherence or less (37 percent of 68 patients). Patients with HCV genotypes 2 or 3 with adherence of 91–100 percent were also more likely to exhibit EVR (91 percent of 713 patients) than those with adherence

of 40 percent or less (67 percent of 18 patients). For patients who showed a virologic response by 24 weeks of treatment, 47 percent of those infected with HCV genotype 1 or 4 and 69 percent of those infected with HCV genotypes 2 or 3 achieved a sustained viral response.

The researchers analyzed electronic medical record data from the National Veterans Affairs (VA) Hepatitis C Clinical Case Registry, together with medication information on these patients from the VA pharmacy database. A total of 5,706 patients treated with pegylated interferon and ribavirin were included in the study. It was funded in part by a grant (HS10399) from the Agency for Healthcare Research and Quality to the University of Pennsylvania Center for Education and Research on Therapeutics (CERT). For more information on the CERTs program visit www.certs.hhs.gov.

More details are in “Relationship between adherence to hepatitis C virus therapy and virologic outcomes,” by Vincent Lo Re III, M.D. M.S.C.E., Valerie Teal, M.S., A. Russell Localio, Ph.D., and others in the September 20, 2011 *Annals of Internal Medicine* 155(6), pp. 353–360. ■ *DIL*

Older patients with chronic conditions have greater risk of problems and death following bilateral knee replacement

Patients needing knee replacement surgery may decide to have both knees done at the same time. While certainly a cost-saving measure, this surgery may also result in increased risk of problems and death for the patient. Understanding which patients may be at risk can help clinicians risk-stratify patients to determine who will have the best outcomes. A new study has identified patient-related risk factors that increase morbidity and mortality in these patients. Often, those most at risk are older patients with certain chronic health conditions.

The researchers analyzed data from 1998 to 2007 as part of the Nationwide Inpatient Survey to identify cases of bilateral knee replacement surgery. During the time period studied, an estimated 206,573 bilateral total knee replacements were performed. About 9.5 percent of patients developed major complications or died while in the hospital. Patients most likely to suffer complications or death were older, male, and white. Patients younger than 45 years of age were half as likely to have a major complication or die than patients between 45 and 64

years of age and one-third as likely to have problems or die than patients aged 65 to 74.

After surgery, the majority of complications were cardiac in nature. Comorbidities associated with major complications or mortality included congestive heart failure and pulmonary hypertension. Given the findings, the researchers suggest that national, evidence-based guidelines be established to help physicians and patients decide if they want to

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Knee replacement surgery

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have both knees replaced at the same time. This study was funded in part by a grant from the Agency for Healthcare Research and Quality (HS16075) to the Hospital for Special Surgery's Center for

Education and Research in Therapeutics (CERT). For more information on the CERTs program, visit www.certs.hhs.gov.

See "Bilateral total knee arthroplasty: Risk factors for major morbidity and mortality," by

Stavros G. Memtsoudis, M.D., Ph.D., Yan Ma, Ph.D., Ya-Lin Chiu, M.S., and others in the October 2011 *Anesthesia and Analgesia* 113, pp. 784-790. ■ KB

Nine percent of adults with hypertension have resistant hypertension

Nearly 9 percent of adults with hypertension in the United States had resistant hypertension between 2003 and 2008, reveals a new study. Resistant hypertension is when blood pressure remains above goal in spite of the concomitant use of antihypertensive medications from three or more drug classes. Stephen D. Persell, M.D., of Northwestern University, found that adults with resistant hypertension differed in many ways from other adults with similar blood pressure, who were treated with one or two medications.

Those with resistant hypertension were more likely to be older, black, and have higher body mass index, impaired kidney function, and a self-reported medical history of coronary heart disease, heart failure, stroke, or diabetes.

Use of diuretics, beta blockers, calcium channel blockers, angiotensin-converting enzyme inhibitors, and angiotensin receptor blockers were all common among those with resistant hypertension.

Most (85.6 percent) patients with resistant hypertension used a diuretic. However, of the diuretic users, 64.4 percent used the weak diuretic, hydrochlorothiazide.

Also, most drug-treated adults with uncontrolled hypertension were receiving medications from only one or two pharmaceutical classes. The author concludes that use of an inadequate medical regimen appears to be observed far more often than true resistance to a regimen that includes drugs from 3 different pharmaceutical classes. He calls for more clinical research to determine optimal therapeutic strategies for individuals with resistant hypertension. In this study, participants were classified as having resistant hypertension if their blood pressure was greater than 140/90 mm Hg (either systolic or diastolic) and they reported using antihypertensive medications from three different drug classes in the past month or received drugs from four or more antihypertensive drug classes regardless of blood pressure. Data for the study was drawn from the National Health and Nutrition Examination Survey. This study was supported by the Agency for Healthcare Research and Quality (HS15647).

See "Prevalence of resistant hypertension in the United States, 2003-2008," by Dr. Persell, in the June 2011 *Hypertension* 57, pp. 1076-1080. ■ MWS

Routinely collecting clinical data can improve pneumococcal vaccination of rheumatology patients on immunosuppressant drugs

Patients with rheumatologic conditions, such as arthritis, often receive medications that can compromise their immune systems. As a result, they may be at risk for pneumonia and other infections. Guidelines from the Centers for Disease Control and Prevention recommend that these patients receive the pneumococcal vaccine. However, vaccination rates remain less than optimal. A new study has investigated how rheumatology

practices can routinely measure clinical and administrative data to monitor and increase the number of patients receiving this vaccine.

Researchers used these data to identify 2,763 patients receiving care in a rheumatology clinic. All were receiving immunosuppressive medications. From this information, it was determined just how many patients were up-to-date with the pneumococcal vaccine either while they were on these

medications or before starting them in the last 12 months.

The majority of patients were white and female. Half of all patients were being treated for rheumatoid arthritis. The most common medication was methotrexate. More than half of all patients (54 percent) were found to be up-to-date with their vaccination. However, only 45 percent of 568

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Pneumococcal vaccination

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patients who were just prescribed medication had been vaccinated before starting it.

Patients who saw younger rheumatologists in practice for 10 years or less had higher vaccination rates (72 percent) compared to those seeing providers in practice

for more than 10 years (52 percent). Practices can use this approach to routinely collect data from billing and electronic health records in order to improve pneumococcal vaccination rates in this group, suggest the researchers. Their study was supported in part by the Agency for Healthcare Research and Quality (HS17030).

See “Routinely measuring and reporting pneumococcal vaccination among immunosuppressed rheumatology outpatients: The first step in improving quality,” by Sonali P. Desai, M.D., Alexander Turchin, M.D., M.S., Lara E. Szent-Gyorgyi, M.P.A., and others in *Rheumatology* 50, pp. 366-372, 2011. ■ KB

Health Information Technology

ICU nurses show increasing acceptance of electronic health records

Acceptance of electronic health record (EHR) technology is particularly important in intensive care units (ICUs) where physicians and nurses experience high workload, patient care is critical, complex decisions need to be made quickly, and interventions must be implemented in a timely manner. Surveys conducted after EHR implementation in four ICUs at a regional medical center revealed that ICU nurses were more accepting of the EHR at 1 year than at 3 months after implementation.

The EHR system includes various functionalities such as computerized provider order entry (CPOE), which is used to review and sign off on entered orders; an electronic medication administration record (eMAR), which is used to review and document medication administration, timing, and comments about the administration; and nursing documentation flow sheets in which nurses record vital signs, patient symptoms, and patient care performed. Nurses viewed both the CPOE and eMAR functions as easier to use 12 months

after implementation. Their perceptions of ease of use of the nursing documentation flow sheets did not change between 3 and 12 months of use, perhaps because the nurses had been using this function for around 2 years before the study began.

Even after 1 year of EHR use, the characteristics of EHR technology (usability and usefulness) have a significant impact on acceptance and use of the technology by ICU nurses. Therefore, it is important for health care organizations to continue their efforts to optimize the design and use of EHR after the technology is implemented, conclude the researchers. This study was supported by the Agency for Healthcare Research and Quality (HS15274).

See “ICU nurses’ acceptance of electronic health records,” by Pascale Carayon, Ph.D., Randi Cartmil, M.S., Mary Ann Blosky, M.S., and others in the *Journal of the American Medical Informatics Association* 8, pp. 812-819, 2011. ■ MWS

Pharmacists have limited awareness of the capabilities of their pharmacy information systems

Clinical decision support (CDS) tools have been part of pharmacy information systems for several decades. Such tools help pharmacists identify drug-drug interactions (DDIs) and patient allergies. While the majority of pharmacists are aware of these functions, fewer are aware of advanced-level functions of

pharmacy information systems, such as laboratory drug-monitoring recommendations and pediatric dosing, reveals a new study.

Participating in the study were 61 pharmacists from a variety of practice settings in Arizona. Each was interviewed about their pharmacy information system features and asked to provide

details about its CDS capabilities. The majority of pharmacists (60.6 percent) worked at community pharmacies, while another 23 percent were employed at inpatient hospital pharmacies. A total of 24 different software systems were used, whether off-the-shelf or custom-made.

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Pharmacy information systems

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Sixty percent of the pharmacists knew that their DDI systems included recommendations for managing drug interactions. However, 40 percent did not know how often the DDI software was updated, with half not knowing the date of the most recent update. Two-thirds of pharmacists interviewed said their system allowed for the addition of medications from other pharmacies as well as over-the-counter products to a patient's profile. In addition, 40

percent said that some drugs entered into the system were not included in the electronic DDI checking. Overall, the majority of pharmacists were aware of drug-disease, drug-age precautions, and inappropriate dosage alerts. However, there was less awareness of advanced-level CDS functions, such as laboratory drug monitoring recommendations (34 percent) and pediatric dosing support (39 percent).

The researchers suggest that pharmacists could benefit from additional training on decision

support features in order to capitalize fully on the capabilities of these systems. Their study was supported in part by the Agency for Healthcare Research and Quality (HS19220).

See "Pharmacists' awareness of clinical decision support in pharmacy information systems: An exploratory evaluation," by Lisa E. Hines, Pharm.D., Kim R. Saverno, R.Ph., B.S. Pharm., Terri L. Warholak, R.Ph., Ph.D., and others in *Research in Social and Administrative Pharmacy* [Epub ahead of print], 2011. ■ KB

Study uncovers the time spent on writing and viewing hospital electronic health records

Clinical documentation of a patient's condition and treatment form the core of the electronic health record (EHR). A new study measured how much of their working time hospital physicians and other providers spend on clinical documentation in the EHR. Using detailed audit logs for EHRs, researchers measured the rate and time of authoring and viewing clinical documentation, as well as associations among users. They found that users spent 20-103 minutes per day authoring notes and 7-56 minutes per day viewing notes, with physicians spending less than 90 minutes per day total.

Overall, 16 percent of notes were never read by anybody. However, 38 percent of nurses' notes went unread by other users. Possible reasons for this are the use of oral communications between successive

nursing shifts and the use of flowsheets instead of nursing notes to report critical information. Medical student notes were read by physicians at a relatively high rate of 81 percent, implying that supervision is substantial.

The use of notes dropped off rapidly after the first day, but even old notes (up to almost 2 years in this study) were viewed at a low but consistent rate. The study was supported in part by the Agency for Healthcare Research and Quality (HS18250).

See "Use of electronic clinical documentation: Time spent and team interactions," by George Hripcsak, M.D., David K. Vawdrey, Ph.D., Matthew R. Fred, M.D., and Susan B. Bostwick, M.D., in the *Journal of the American Medical Informatics Association* 18, pp. 112-117, 2011. ■ MWS

Electronic health records in community health centers provide a better picture of care than insurance claims data

In community health centers (CHCs), insurance claims data documenting the receipt of preventive health services can be incomplete. In fact, relying solely on Medicaid claims data is likely to substantially underestimate the quality of care, concludes a new

study. It found that electronic health record (EHR) data provided a more complete picture than did data from Medicaid claims for preventive diabetes care received at 50 CHCs. The combined EHR and Medicaid claims data provided the most complete picture, according to a

team of Oregon-based researchers led by Jennifer E. DeVoe, M.D.

For example, EHR records documented the following services not found in the Medicaid claims data: 49.3 percent of cholesterol

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Electronic health records

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screenings, 50.4 percent of influenza vaccinations, 50.1 percent of nephropathy screenings, and 48.4 percent of HbA1c tests of blood-glucose level. By contrast, Medicaid claims data documented much smaller percentages of those services not found in the EHR: 11.6 percent of cholesterol screenings, 7.0 percent of influenza vaccinations, 10.5 percent of nephropathy screenings, and 8.8 percent of HbA1c tests. Those who were more likely to have services documented in the EHR but not in the Medicaid claims data included

patients who were Spanish-speaking, above the Federal poverty level, or who had noncontinuous insurance.

An important part of most health care quality assessment efforts is measuring rates of receipt of recommended services. However, insurance claims data can be incomplete since not all services received are billed. Also, patients change insurers, and they may not have continuous health insurance. Since CHCs provide services to uninsured populations, their medical records include information about receipt of care that would not be captured in

claims data. The findings were based on analysis of receipt of preventive services in 50 Oregon CHCs among established diabetes patients who had ever been enrolled in Medicaid. This study was supported in part by the Agency for Healthcare Research and Quality (HS16181).

See “Electronic health records vs. Medicaid claims: Completeness of diabetes preventive care data in community health centers,” by Dr. DeVoe, Rachel Gold, Ph.D., Patti McIntire, B.A., and others in the July/August 2011 *Annals of Family Medicine* 9(4), pp. 351-358. ■
MWS

Comparative Effectiveness Research

Bone marrow transplant is beneficial for some rare pediatric conditions

Hematopoietic Stem-Cell Transplant (HSCT, also known as bone marrow transplant) for pediatric conditions, can be an effective treatment for Wolman’s disease and Faber’s disease Type 2/3, both rare fatal inherited metabolic disorders. That’s the conclusion of a new research review from the Effective Health Care Program of the Agency for Healthcare Research and Quality (AHRQ). There is very limited evidence to suggest that autologous HSCT was associated with extended periods of drug-free clinical remission in a number of autoimmune diseases, including newly diagnosed type 1 juvenile diabetes and severe refractory juvenile idiopathic arthritis, systemic lupus erythematosus, systemic sclerosis, and Crohn’s disease. However, the evidence is insufficient to determine the overall long-term benefits or harms of

HSCT for these pediatric diseases. For the vast majority of rare pediatric diseases there is insufficient evidence to draw any conclusions about the benefit or harm of HSCT versus other approaches.

These findings are summarized in the research review, *Hematopoietic Stem-Cell Transplantation in the Pediatric Population*, and the future research needs are identified in an accompanying report, *Future Research Needs for Hematopoietic Stem-Cell Transplantation in the Pediatric Population*. These materials and many others that explore the effectiveness and risks of treatment options for various conditions are available on AHRQ’s Effective Health Care Program Web site, www.effectivehealthcare.ahrq.gov. ■

Little evidence for benefit of interventions in the early stage of chronic kidney disease

A new research review from the Agency for Healthcare Research and Quality (AHRQ) found no or limited evidence that interventions are beneficial to patients in the early stages of chronic kidney disease. The report evaluated the evidence regarding the potential benefits and harms of screening, monitoring, and treatment of adults in stage 1, 2, or 3 of the five stages of chronic kidney

disease. The report authors noted that many knowledge gaps remain, and additional research should increase understanding about optimal approaches to chronic kidney disease screening, monitoring, and treatment.

Chronic kidney disease affects more than 44 percent of U.S. adults over the age of 70.

The report, *Chronic Kidney Disease Stages 1-3: Screening, Monitoring, and Treatment* and many other materials are available on the AHRQ's Effective Health Care Program Web site at www.effectivehealthcare.ahrq.gov. ■

Evidence lacking to support surgery for pelvic pain

Despite the extensive use of invasive surgical procedures to treat women with noncyclic chronic pelvic pain, little evidence supports a surgical approach, according to a new research review from the Agency for Healthcare Research and Quality (AHRQ). No surgical approach was found to be superior to a nonsurgical or comparative surgical approach. While the prevalence of noncyclic (not occurring during menstruation) chronic pelvic pain rivals other widely studied conditions, there is little research assessing therapies, particularly nonsurgical interventions.

The report, *Noncyclic Chronic Pelvic Pain Therapies for Women: Comparative Effectiveness* produced by

AHRQ's Effective Health Care Program, summarizes evidence on the benefits and harms of surgical and nonsurgical treatments for women over the age of 18 with noncyclic chronic pelvic pain. Given the lack of high-quality evidence, future research is needed to investigate and compare the effectiveness of surgical, pharmacologic, and nonpharmacologic therapies to better understand the causes of the condition and standardize terminology, definitions, and diagnostic approaches.

You can read and download the full review and other publications from AHRQ's Effective Health Care Program Web site, www.effectivehealthcare.ahrq.gov. ■

More research needed to evaluate self-measured blood pressure monitoring

Self-measured blood pressure (SMBP) monitoring to manage hypertension may offer a small benefit, but its sustainability and long-term consequences remain uncertain. That's the conclusion of a new research review from the Agency for Healthcare Research and Quality's Effective Health Care Program. The review summarizes evidence on the effectiveness of SMBP, with or without clinical support. It found that assessing the

impact of SMBP monitoring accompanied by additional clinical support is difficult, given the small number of trials to assess diverse approaches. However, SMBP plus support may slightly improve blood pressure control when compared to usual care for at least up to 12 months, the report concluded. More research is needed on the long-term effects and sustainability of SMBP monitoring along with better standardization of research

protocols to increase the applicability of findings and predictors of adherence.

The review, *Self-Measured Blood Pressure Monitoring: Comparative Effectiveness*, adds to AHRQ's growing collection of resources on cardiovascular health. These new materials and many others are available on AHRQ's Effective Health Care Program Web site, www.effectivehealthcare.ahrq.gov. ■

Evidence lacking on how to match wheelchairs with patients

Insufficient evidence on the wheeled mobility (wheelchair) delivery process can lead to a lack of funding for recommended service delivery steps. This lack of funding can result in physicians and suppliers limiting their selection of equipment and services and manufacturers hesitating to develop high-quality products for

consumers. Yet a new report from AHRQ's Effective Health Care Program highlights several issues that warrant further high-quality research in order to develop an evidence base for wheeled mobility service delivery.

The report provides an overview of the literature and expert opinions on

delivery of wheeled mobility service to long-term wheelchair users with complex rehabilitation needs. It also focuses on the elements that affect the quality of a match between patients and their wheeled devices. Download and read the report, *Wheeled Mobility (Wheelchair) Service Delivery*, at www.effectivehealthcare.ahrq.gov. ■

Some diabetes practice guidelines do not reflect all available evidence

Not all clinical practice guidelines on the use of oral medications for type 2 diabetes are consistent with a systematic review of all available scientific evidence funded by AHRQ, according to a new analysis published in the January 17, 2012 online *Annals of Internal Medicine*. None of the guidelines, however, included recommendations that contradicted available evidence. The evaluation, conducted by researchers at Johns Hopkins University, found that some diabetes treatment guidelines did not fully reflect evidence identified in a 2007 systematic review on diabetes treatments developed by AHRQ's Effective Health Care Program. The new analysis, *An Evaluation of Guideline Recommendations Related to Oral Medication Treatment for Type 2 Diabetes Mellitus*, examined 11 diabetes

guidelines that met the study criteria and assessed whether the guidelines agreed with seven evidence-based conclusions from the 2007 systematic review. Seven guidelines, according to the analysis, agreed with the conclusion that "metformin is favored as the first line agent," and 10 agreed that "thiazolidinediones are associated with higher rates of edema and congestive heart failure." The analysis also found variability in guideline quality. Most guideline development processes did not include a systematic method for determining which evidence to incorporate. Additional information about type 2 diabetes oral medications, including a 2011 update of AHRQ's 2007 report, can be found at www.effectivehealthcare.ahrq.gov. ■

Disparities/Minority Health

Watching patient stories on DVDs improves blood pressure control among blacks

Storytelling, which is emerging as a powerful tool for health promotion in vulnerable populations, is a novel approach being used to help blacks make the lifestyle changes necessary to lower blood pressure. A new study found that black patients who watched story segments on DVDs of others sharing their stories about high blood pressure helped them make substantial improvements in their own blood pressure. A total of 299 blacks with hypertension were

selected from an inner-city clinic in the South. Of these, 147 were assigned to the storytelling intervention, while the other 152 were assigned to the usual-care group.

Those in the intervention group received three DVDs; the first one they watched in the clinic, and the other two were sent to their home. Blood pressure was measured initially, and again at 3, 6, and 9 months later. Each DVD contained various patients with hypertension,

who discussed how they lived with high blood pressure, and offered tips on how to adhere to medications, talk to the doctor, avoid hidden salt, and increase exercise. Participants randomized into the usual-care group received a DVD containing local news health messages unrelated to hypertension. Most of the participants were women (71.4 percent) with an average age of 53.7 years. Patients

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Blood pressure control

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with uncontrolled hypertension assigned to the intervention group showed an 11-mm Hg greater reduction in systolic blood pressure than the usual-care group and meaningful reduction in diastolic blood pressure by 3 months. Blood pressure subsequently increased for both groups, but the relative

advantage of the storytelling intervention persisted at 6 and 9 months. Patients in the intervention group reported watching at least 1 video segment from each of the 3 DVDs for a total of 87.5 minutes viewing time. The study was supported in part by the Agency for Healthcare Research and Quality (HS19353).

See “Culturally appropriate storytelling to improve blood pressure: A randomized trial,” by Thomas K. Houston, M.D., M.P.H., Jeroan J. Allison, M.D., M.Sc., Marc Sussman, M.H.A., and others in the *Annals of Internal Medicine* 154(2), pp. 77-84, 2011. ■ KB

Study identifies attributes of surgeons more willing to provide charity care

No organized system exists for the delivery of elective surgical care to uninsured U.S. residents. Local access to care programs (LACPs) represent a promising strategy for providing uninsured patients with access to timely non-emergency care. These programs, typically administered by a local nonprofit agency, provide a structured set of health benefits to eligible uninsured patients at little or no cost. A new study identifies surgeons who are more likely to provide charity care for LACPs.

Researchers from the University of North Carolina at Chapel Hill and Duke University used survey data to determine which demographic and practice characteristics were associated with a surgeon's willingness to provide charity care. They found that a greater amount of charity care was provided by surgeons who were male, owned their own practice, were employed in academic medical centers, or earned a greater proportion of their revenue from Medicaid.

The strongest predictors of charity care hours were academic practice and share of income derived from Medicaid. Surgeons who worked in a group HMO were significantly less likely to provide any charity care.

Participation in LACPs has some advantages over ad hoc pro bono care. For example, LACPs obtain commitments from local hospitals to provide enrolled patients with needed laboratory tests and other services. Also, LACPs provide their patients with many services such as transportation and translation assistance. This study was supported in part by the Agency for Healthcare Research and Quality (T32 HS00032).

See “Characterizing and fostering charity care in the surgeon workforce,” by D. Brad Wright, Ph.D., and John E. Scarborough, M.D., in the July 2011 *Annals of Surgery* 254(1), pp. 169-173. ■ MWS

Primary Care

Growth in the physician assistant workforce will be insufficient to meet future needs of primary care

The growth of physician assistants (PAs) in the U.S. medical workforce will not be sufficient to meet the future needs of primary care, especially given the predicted shortage of primary care physicians, concludes a new study. The study simulated projected growth in PA supply between 2010 and 2025. It found that the current

number of PAs (72,000) will grow by almost 72 percent by 2025. However, this growth rate will likely only provide 16 percent of the providers needed to address the projected primary care physician shortage.

In 2010, there were 154 accredited PA education programs, and 152

produced a graduating class. Of the 6,688 graduates in 2010 (an average of 44 graduates per program), 97 percent were expected to enter the pool of clinically active PAs. Of these graduates, the mean age was 29 years and 75 percent were female. With a 7 percent

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increase in the graduate entry rate and a 5 percent annual attrition rate, the supply of clinically active PAs was projected to grow to 93,099 in 2012 and to 127,821 by 2015. This model held clinically active PAs in primary care at 34 percent.

Given the need to mitigate the expected physician shortage, policy steps enacted in 2010 to fund and promote an increased annual supply of PAs appear justified, suggest the researchers. Their study was supported in part by the Agency for Healthcare Research and Quality (T32 HS00083).

See “Predictive modeling the physician assistant supply: 2010-2025,” by Roderick S. Hooker, Ph.D., James F. Cawley, M.P.H., and Christine M. Everett, M.P.H., in the September/October 2011 *Public Health Reports* 126, pp. 708-716. ■ *MWS*

Child/Adolescent Health

Despite recommendations against it, early discharge of late-preterm newborns remains common

Like King Canute of England ordering the tides to stop, professional medical societies can issue guidelines to spread the use of best practices, but will practitioners and patients listen? A new study of early hospital discharges of late-preterm (LP) newborns in 3 States over 10 years suggests that many will but some may not. Early hospital discharge (less than 48 hours after birth) for LP infants (delivered vaginally and born live at 34–36 weeks’ gestation) is a practice advised against by the American Academy of Pediatrics (AAP). That’s because these newborns are at higher risk of neonatal complications.

The researchers found that 51.4 percent of 282,601 LP newborns in the study were discharged early. From 1995, when the AAP first issued a policy statement about early discharge for LP newborns, to 2000, the early discharge rate declined from 71 percent to 44 percent. This decline tapered off thereafter, so that by 2005 the rate of early discharges for these newborns had only reached 40 percent. The time trends were similar between teaching and nonteaching hospitals in the study, although the percentage of early discharges at teaching hospitals was lower.

The researchers studied LP births from 611 hospitals in California, Pennsylvania, and Missouri. In unadjusted analysis, Hispanic ethnicity, lack of insurance, and California residence were associated with early discharge. LP newborns whose mothers were under 20 years old were 22 percent more likely to be discharged early than those whose mothers were 20–35 years old, while those with mothers over age 35 were 26 percent less likely to have early discharge.

Newborns whose mothers had previous children were 18 percent more likely to be discharged early. Black newborns were 20 percent less likely than white newborns to be discharged early. Rural hospitals and isolated rural locations were more likely (58 and 81 percent, respectively) to discharge LP newborns early than were urban hospitals. The study was funded in part by the Agency for Healthcare Research and Quality (HS15696).

More details are in “Adherence to discharge guidelines for late-preterm newborns” by Neera K. Goyal, M.D., Corinne Fager, M.S., and Scott A. Lorch, M.D., M.S.C.E., in the July 2011 *Pediatrics* 128(1), pp. 62-71. ■ *DIL*

Pediatric nurses express differing perspectives on palliative care

Pediatric nurses play a crucial role in providing palliative, end-of-life, and bereavement (PEOLB) care to dying children and their families. A survey of 410 nurses working in a children's hospital revealed how nurses perceive PEOLB care. It found that nurses individually endorsed managing pain, maintaining the quality of life, and improving communication as the most important goals of palliative care. The leading problems facing optimal palliative care, the nurses believed, were the lack of opportunity to debrief after a patient's death, uncertainty about the goals of care, and the team's reluctance to discuss hospice with the family.

The researchers found that with respect to both the importance of particular goals of palliative care and the problems facing palliative care, nurses' opinions clustered into

5 groups. Large clusters of nurses reported that all goals were important (25 percent) and all problems were significant (30 percent). With regard to palliative care goals, each group endorsed pain control, while rejecting one particular type of goal: spiritual care and hospice (26 percent), symptom management (19 percent), hospice (13 percent), or psychosocial and communication support (17 percent). Three groups differed regarding what they perceived as the most significant problems: unaddressed spirituality concerns (28 percent); inadequate clarifications of treatment goals, poor communication, and nondiscussion of hospice (9 percent); and a cultural bias against pediatric palliative care and underuse of do-not-resuscitate orders (22 percent). A final group viewed no specific problem as especially significant.

The hospital unit was the most important factor in predicting nurses' degree of collaboration with the palliative care team, even after accounting for individual characteristics. The researchers conclude that by raising awareness of differing perspectives among nurses and hospital units, surveys can allow educational outreach programs to better hone their messages to different groups of nurses, and hopefully to greater effect. This study was supported in part by the Agency for Healthcare Research and Quality (T32 HS00002).

See "Pediatric nurses' individual and group assessments of palliative, end-of-life, and bereavement care," by Heather L. Tubbs-Cooley, Ph.D., R.N., Gina Santucci, M.S.N., Tammy I. Kang, M.D., and others in the *Journal of Palliative Medicine* 14(5), pp. 631-637, 2011. ■ MWS

Mental Health

Diagnosis and treatment rates for depression in older adults have grown over time, with medication edging out therapy

Depression, quite common in the elderly, can lead to reduced life expectancy, hospitalization, and even suicide. Both drugs and psychotherapy are effective in treating depression, although their combined use has been shown to be more effective than either one alone. A new study found that depression diagnosis and treatment rates have increased over time. In addition, drugs have become the preferred method of treatment over psychotherapy.

Researchers analyzed national Medicare data from 1992 to 2005 on fee-for-service Medicare beneficiaries who lived in the community. They identified individuals with a diagnosis of depression and the types of treatment they received.

Between 1992 to 1995 and 2002 to 2005, the overall annual rates of depression in this group doubled from 3.2 percent to 6.3 percent. Along with this increase in diagnosis was an increase in treatment. Antidepressant use increased from 53.7 percent to 67.1 percent. At the same time, the use of psychotherapy declined from 26.1 percent to 14.8 percent. Among those 85 years of age and older, the increased use of antidepressants was greatest, rising from 42 percent to 65 percent. By 2005, less than half of patients with major depressive disorder received psychotherapy. Only 5.6 percent of patients with other depression diagnoses were treated in this manner.

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Depression

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The findings suggest that, despite its benefits, psychotherapy is being underutilized in older patients with depression. The study was supported in part by the Agency for Healthcare Research and Quality (HS16097).

See “Diagnosis and treatment of depression in older community-dwelling adults: 1992-2005,” by Ayse Akincigil, Ph.D., Mark Olfson, M.D., James T. Walkup, Ph.D., and others in the *Journal of the American Geriatrics Society* 59(6), pp. 1042-1051, 2011. ■ KB

More patients are being prescribed antidepressants by non-psychiatrists and without a psychiatric diagnosis

Antidepressants now account for the third most commonly prescribed class of medication in the United States. Fueling this growth are non-psychiatrist providers who prescribe them without a psychiatric diagnosis. A new study found that the proportion of patient visits to these physicians where antidepressants were prescribed without a psychiatric diagnosis grew from 59.5 percent in 1996 to 72.7 percent in 2007.

Of all the visits to non-psychiatrist physicians, 45.8 percent were to primary care physicians. Antidepressants were prescribed in 9.3 percent of primary care visits and 3.6 percent of visits to other non-psychiatrist physicians. During the study period, there was a significant increase in antidepressant visits without a psychiatric diagnosis. The proportion of antidepressant visits

without a psychiatric diagnosis grew from 2.5 percent of all visits to non-psychiatrist providers to 6.4 percent. The increase was 3.1 percent to 7.1 percent for primary care providers. Patients prescribed an antidepressant for a non-psychiatric disorder were more likely to be age 50 or older, have diabetes or heart disease, have two or more medical conditions, and have nonspecific pain or abnormal sensations.

To the extent that antidepressants are being prescribed for uses not supported by clinical evidence indicates several needs, suggest the authors. For example, there may be a need to improve providers' prescribing practices, revamp drug formularies, or pursue broad reforms of the health care system that will boost communication between primary care providers and mental health specialists. The

findings were based on analysis of data from the National Ambulatory Medical Care Surveys on patients' social, demographic, and clinical characteristics, as well as details on reasons for the medical visits and medications prescribed at each visit. The study was funded in part by a grant from the Agency for Healthcare Research and Quality (HS16097) to Rutgers University's Center for Research and Education on Mental Health Therapeutics, part of AHRQ's Center for Education and Research on Therapeutics (CERT) program. For more information on the CERTs program, visit www.certs.hhs.gov.

See “Proportion of antidepressants prescribed without a psychiatric diagnosis is growing,” by Ramin Mojtabai, M.D., Ph.D., and Mark Olfson, M.D., in the August 2011 *Health Affairs* 30(8), pp. 1434-1442. ■ KB

Adherence to bipolar medications may also promote adherence to antiretroviral therapy

Individuals with bipolar disorder and other severe mental illnesses are more likely to have higher rates of HIV infection compared to the general population, possibly due to impulsive behaviors or substance use disorders. Individuals with bipolar disorder usually require long-term treatment with various psychotropic medications. Patients with bipolar disorder, who adhere to their bipolar medications, are also more likely to adhere to their antiretroviral treatment for HIV infection, suggests a new study using prescription refill data.

It retrospectively examined data from Medicaid claims in 8 States from 2001 to 2004. A total of 10,971 beneficiaries were identified as having both bipolar disorder and HIV infection. The final sample included 1,687 patients.

During a mean observation period of 32 months, antiretrovirals were refilled in 72 percent of the months. Bipolar medications were refilled in 55

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Bipolar medications

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percent of the months. There were higher rates of antiretroviral adherence when patients adhered to their bipolar medications. For example, when a bipolar medication was not filled in the prior month, the antiretroviral fill rate was 65 percent in the subsequent month, compared to a 78 percent antiretroviral fill when a bipolar medication was refilled the prior month.

Antiretroviral fill rates were higher for men and for beneficiaries 50 years of age and older. When there was a coexisting substance use disorder, the antiretroviral fill rate was significantly lower. This study was funded

in part by the Agency for Healthcare Research and Quality (HS16097) to Rutgers University's Center for Research and Education on Mental Health Therapeutics, part of AHRQ's Centers for Education and Research on Therapeutics (CERTs) Program. For more information on the CERTs program, visit www.certs.hhs.gov.

See "Bipolar medication use and adherence to antiretroviral therapy among patients with HIV-AIDS and bipolar disorder," by James T. Walkup, Ph.D., Ayse Akincigil, Ph.D., Sujoy Chakravarty, Ph.D., and others in *Psychiatric Services* 62(3), pp. 313-316, 2011. ■ KB

Elderly/Long-Term Care

Preventing pressure ulcers in the home requires creative solutions by nurses

Many patients in hospitals and long-term care facilities are prone to pressure ulcers. However, pressure ulcers can also occur in individuals being cared for at home. A new study found that wound care nurses use many of the preventive interventions recommended for the institutional setting, but also use new approaches and creative solutions to avoid pressure ulcer development during home care.

The researchers conducted a focus group with nine certified wound care nurses, who had 5 or more years of wound care experience and 10 or more years of home health experience. They all practiced their clinical skills in the home care setting at least half of the time. During the 75-minute focus group discussion, the nurses were asked open-ended questions about how they cared for home-bound patients to prevent pressure ulcers.

Participating nurses felt it was important to do a skin assessment and assess for pressure ulcer risk when the patient was admitted for home health care. They provided individualized patient education and emphasized the importance of partnering with family or other caregivers to stop pressure ulcer occurrence. They routinely assessed caregiving resources, as well as the potential of caregivers to effectively manage pressure ulcer prevention care.

Providing appropriate preventive care was often challenging and sometimes frustrating. Medicare does not usually cover pressure redistribution surfaces or other prevention products for patients who are at risk for pressure ulcers. The nurses had to inquire about the patient's economic and insurance status to determine what interventions were feasible. Approaches to improving patient nutrition also required careful

consideration of the patient's economic status. When insurance coverage was minimal or lacking and the patient could not afford the out-of-pocket expense, nurses contacted community resources and vendors to try and get materials and supplies needed by the patient. Most of the nurses agreed that knowledge of resources within their community is crucial to pressure ulcer prevention in home health care. The study was supported in part by the Agency for Healthcare Research and Quality (HS17353).

See "Adapting pressure ulcer prevention for use in home health care," by Sandra Bergquist-Beringer, Ph.D., R.N. and Christine Makosky Daley, Ph.D., in the *Journal of Wound, Ostomy, and Continence Nursing* 38(2), 145-154, 2011. ■ KB

Medicaid nursing home reimbursement affects nursing homes' approach to end-of-life care

About 70 percent of all U.S. nursing home days are paid for by Medicaid. Medicaid reimbursement policy and rates have been found to affect nursing home hospitalizations and resident outcomes. Now a new study shows that increases in a State's average nursing home per diem payment significantly affects nursing home use of Medicare hospice. However, this effect is in opposing directions in urban versus rural nursing homes nonadjacent to urban areas, according to Susan Miller, Ph.D., and a team of researchers from the Warren Alpert Medical School of Brown University.

In urban settings, a \$10 increase in a State's average Medicaid payment resulted in a half percent increase in nursing home hospice use. However, in rural nonadjacent areas a \$10 increase resulted in a half percent decrease in hospice use. Revenue constraints

for both nursing homes and hospices in rural nonadjacent settings most likely combine to explain this markedly different effect.

In contrast, with a State's introduction of Medicaid case-mix reimbursement, both urban and rural adjacent and nonadjacent nursing homes increased hospice use by 2 percent. This study was supported in part by the Agency for Healthcare Research and Quality (HS16918).

See "The effect of Medicaid nursing home reimbursement policy on Medicare hospice use in nursing homes," by Susan C. Miller, Ph.D., Pedro Gozalo, Ph.D., Julie C. Lima, Ph.D., and Vincent Mor, Ph.D., in the September 2011 *Medical Care* 49(9), pp. 797-802. ■ MWS

Health Literacy

Health literacy issues less of a problem for patients with dental versus medical conditions

Approximately one in three Americans lack health literacy. They do not have the ability to obtain, process, or comprehend basic health information required to make appropriate decisions about their health. However, a new study suggests that inadequate dental health literacy is not a big problem. Richard J. Manski, D.D.S., Ph.D., M.B.A., of the Agency for Healthcare Research and Quality, and colleagues surveyed low-income patients seeking care for dental problems or injuries from physicians' offices, emergency departments, or dentists. They found that 10 percent said they had difficulty understanding what they were being told. A smaller percentage

(4.9 percent) of patients said they found it hard to understand the dental or medical forms they were asked to complete. Finally, 6.9 percent reported that they had difficulty getting the health care provider to understand their dental problem or injury.

The difference in these findings and general health literacy findings may be due at least in part to the more direct and less complicated nature of patient-provider interactions surrounding dental problems, suggest the researchers. Dental encounters generally involve less complicated diagnostic procedures and treatment and demand less of the patient in managing their conditions than do medical

encounters. This study did find that males and Hispanics were more likely than others to experience a problem. Those surveyed were low-income white, black, and Hispanic adults who had experienced a dental problem or injury in the preceding 12 months.

See "Health literacy impact on patient-provider interactions involving the treatment of dental problems," by Leonard A. Cohen, D.D.S., Arthur J. Bonito, Ph.D., Celila Eicheldinger, B.S., and others in the *Journal of Dental Education* 75(9), pp. 1218-1224, 2011. Reprints (AHRQ Publication No. 12-R001) are available from AHRQ.* ■ MWS

Hospital stays involving *C. difficile* infections leveled off after 300 percent increase since 1993

Hospital stays involving *Clostridium difficile* infections, which can cause severe diarrhea, colitis, and even death, increased 300 percent between 1993 and 2008.

However, the number of hospital stays leveled off between 2008 and 2009, according to the latest News and Numbers from the Agency for Healthcare Research and Quality (AHRQ). There were 86,000 hospital stays involving *C. difficile* in 1993, increasing to 349,000 in 2008. But in 2009 there were about 337,000 stays.

C. difficile is a bacterium that causes an intestinal infection. While normally present in the intestine, this bacterium may dominate when antibiotics are taken and causes inflammation and bleeding in the colon. In its most severe form, *C. difficile* can be treated only by completely removing the colon.

Common conditions among patients hospitalized with *C. difficile* in 2009 included dehydration and electrolyte disorders, blood infections, and renal failure. Hospital stays for *C. difficile* include any diagnosis coded as *C. difficile*, regardless of when the condition started.

AHRQ reported that among all hospitalized patients with *C. difficile* in 2009:

- Patients age 85 and older were at highest risk, with hospital stays at a rate of 1,089 per 100,000 people. This was more than double the next highest rate, for those age 65 to 84, at 465 stays per 100,000.
- More than 9 percent of hospital stays with *C. difficile* ended in death, compared with less than 2 percent for all other hospital stays.
- Patients with this condition spent an average of 13 days in the hospital, while the average hospital stay for others was less than 5 days.

This AHRQ News and Numbers summary is based on data from Statistical Brief #124: *Clostridium difficile* Infections (CDI) in Hospital Stays, 2009 (www.hcup-us.ahrq.gov/reports/statbriefs/sb124.pdf). The report uses data from AHRQ's Nationwide Inpatient Sample. For information about this AHRQ database, go to www.ahrq.gov/data/hcup/datahcup.htm.

For more information, or to speak with an AHRQ data expert, please contact Linwood Norman at linwood.norman@ahrq.hhs.gov or call (301) 427-1248. ■

AHRQ publishes cancer hospitalization statistics

A new statistical brief from AHRQ, *Cancer Hospitalizations for Adults, 2009*, presents information on hospital stays for cancer care among adults age 18 and older by type of cancer. It also compares them to adult hospital stays for other conditions. The data are from the Nationwide Inpatient Sample, a database of the AHRQ-administered Healthcare Cost and Utilization Project. The report can be found at www.hcup-us.ahrq.gov/reports/statbriefs/sb125.pdf. ■

AHRQ releases pharmacy health literacy modules for faculty

The Agency for Healthcare Research and Quality (AHRQ) has released a set of curricular modules to help pharmacy faculty integrate health literacy quality improvement into courses, experiential education, and for Pharm.D. thesis or pharmacy residency projects. *Advancing Pharmacy Health Literacy Practices Through Quality Improvement: Curricular Modules for*

Faculty includes four PowerPoint slide sets, over a dozen different activity guides to encourage active learning, resources to provide faculty and students with background information, and references for the topics covered in the curricular modules. For more information about the modules go to www.ahrq.gov/pharmhealthlit/index.html#pharmlitqi ■

New public reporting funding opportunity

In collaboration with the Centers for Medicare & Medicaid Services, the Agency for Health Care Research and Quality is seeking to build the science base behind the public reporting of health care measures, and encourages qualified

researchers to apply. This initiative seeks to support research that will inform the development of a health care system in which consumers have ready access to reports that allow meaningful comparison of providers based on measures of

quality and resource use. Applications are due by March 28, 2012. To view the full funding opportunity announcement, please visit <http://grants.nih.gov/grants/guide/rfa-files/RFA-HS-12-004.html>. ■

Opportunities to improve primary care services for adults with complex needs highlighted in new white paper and brief

A white paper and brief highlighting opportunities to improve primary care services for adults with complex care needs were published in January by the Agency for Healthcare Research and Quality and Mathematica Policy Research. A summary of the white paper was published by the *Annals of Family Medicine* on January 9th.

The patient-centered medical home (PCMH) is a model for strengthening primary care through the reorganization of existing practices. Its goal is to provide patient-centered, comprehensive, coordinated, and accessible care that is continuously improved through a systems-based approach to quality and safety. PCMH efforts have focused thus far on improved access to and coordination of medical services for all patients.

However, patients with more complex health care needs require more intensive medical services coordinated across multiple providers, as well as a wide range of social supports to maintain health and functioning. Two groups of community-dwelling patients have especially complex health and social support needs: frail elderly and working-age adults with disabilities. Medical homes face many challenges in providing optimal care to these patients.

The brief and white paper address how decisionmakers can help smaller primary care practices become effective PCMHs for patients with complex care needs, and what research would aid this process.

The decisionmaker brief offers programmatic and policy changes that can help primary care practices, especially smaller ones, better deliver services to all patients, including those with the most complex health needs. The white paper provides a more in-depth look at the strategies that are available to help primary care practices coordinate the full range of requisite medical and social services, and perform as effective medical homes for patients with complex care needs. It profiles five exemplary programs and demonstrates how each has developed specific approaches to serve these patients. It also offers insights both on ways decisionmakers can support these innovative approaches and how researchers can illuminate the path to primary care transformation.

You can access these publications and other resources at the PCMH Web site at www.pcmh.ahrq.gov. ■

Ash, J.S., Sittig, D.F., Wright, A., and others. (2011). “Clinical decision support in small community practice settings: A case study.” (AHRQ Contract No. 290-2008-10010). *Journal of the Medical Informatics Association* 18, pp. 879-882.

This case study describes an independent practice association that has implemented a commercial electronic health record system with clinical decision support (CDS). A multi-disciplinary team of investigators identified barriers and facilitators to CDS implementation. An eight-dimensional model proved useful as an organizing structure for the evaluation.

Brady, J., Ho, K., and Clancy, C.M. (2011). “The Quality and Disparity Reports: Why is progress so slow?” *American Journal of Medical Quality* 23, pp. 396-398. Reprints (AHRQ Publication No. 12-R029) are available from AHRQ.*

The authors emphasize that the rate of quality improvement in American health care is modest and appears to be slowing. They note that the annual quality and disparity reports published by the Agency for Healthcare Research and Quality, which show variations in quality from State to State, reveal opportunities for improvement. They also emphasize that patient safety results show slow improvement and that significant disparities in care exist for minorities. In addition to geography

and minority status, age, income, and insurance status are important factors in care disparities.

Chang, S.M. (2011). “The Agency for Healthcare Research and Quality Effective Health Care Program Methods Guide for Comparative Effectiveness Reviews: Keeping up-to-date in a rapidly evolving field.” *Journal of Clinical Epidemiology* 64, pp. 1166-1167. Reprints (AHRQ Publication No. 12-R022) are available from AHRQ.*

The Agency for Healthcare Research and Quality Methods Guide is a collaborative effort among participating scientists to identify the best methods for conducting systematic reviews on comparative effectiveness of medical interventions. The author introduces five papers in this issue of the journal that nearly completes version 1.0 of the guide. These articles address areas of unnecessary variation, uncertainty, and areas of controversy raised by peer or public review of early comparative effectiveness reviews.

Crabtree, B.F., Nutting, P.A., Miller, W.L., and others. (2011, December). “Primary care practice transformation is hard work. Insights from a 15-year developmental program of research.” (AHRQ grant HS8776). *Medical Care* 49(12), Suppl. 1, pp. S28-S35.

The authors highlight critical findings from a 15-year developmental program aimed at

enhancing quality of care in primary care practice. Based on studying over 350 primary care practices, the program’s results show that these practices are very complicated small organizations with multiple competing demands, dual hierarchies, and challenging relationship systems. The authors conclude that a theoretical framework guided by complexity science can help in the development of quality improvement strategies.

Curtis, J.R. (2011). “Improving osteoporosis care through multimodal interventions: Insights from the University of Alabama at Birmingham Center for Education and Research on Therapeutics.” (AHRQ grants HS18517, HS20144). *Osteoporosis International* 22(9), Suppl. 3, S445-S450.

One aspect of translational research, sometimes called evidence implementation or implementation science, applies what has been learned about clinical medicine to achieve best practices across providers and health systems. The author describes evidence implementation as applied to osteoporosis care, drawing from several published or ongoing studies to illustrate challenges and potential solutions to improving the quality of osteoporosis care. He concludes that a systems-based team approach engaging patients and providers is likely to be most effective.

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Research briefs

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Dahabreh, I.J., Hadar, N., and Chung, M. (2011). “Emerging magnetic resonance imaging technologies for musculoskeletal imaging under loading stress: Scope of the literature.” (AHRQ Contract No. 290-07-100551). *Annals of Internal Medicine* 155, pp. 616-624.

The authors review 57 studies about magnetic resonance imaging (MRI) for musculoskeletal conditions performed in an upright or sitting position or under axial load by using a compression device. They find that research on this type of MRI, known as a stress-loading MRI, is at an early developmental state with most studies focusing on non-clinically relevant endpoints. Therefore, its use should probably be considered experimental.

Ford, C.A., Davenport, A.F., Meier, A., and McRee, A.-L. (2011). “Partnerships between parents and health care professionals to improve adolescent health.” (AHRQ grant HS16021). *Journal of Adolescent Health* 49, pp. 53-57.

The study objective was to combine the perspectives of parents, health care professionals (HCPs), and adolescents to develop a framework for future parent-HCP partnership research to improve adolescent health. Using focus groups and in-depth semi-structured interviews, the researchers explored the perceptions of HCPs and mothers regarding the roles of parents, HCPs, and parent-HCP partnerships in preventing and addressing adolescent health problems. Also discussed are a number of direct and indirect strategies to improve adolescent health.

Fu, R., Gartlehner, G., Grant, M., and others. (2011). “Conducting quantitative synthesis when comparing medical interventions: AHRQ and the Effective Health Care Program.” *Journal of Clinical Epidemiology* 64, pp. 1187-1197. Reprints (AHRQ Publication No. 12-R024) are available from AHRQ.*

The article summarizes the authors’ recommendations in conducting quantitative synthesis of comparative effectiveness research for therapeutic benefits and harms for the Effective Health Care Program with the goal to improve consistency and transparency. The recommendations cover recurrent issues in the Evidence-based Practice Center Program and focus on methods for combining study-level effect measures.

Giardina, T.D., and Singh, H. (2011, December). “Should patients get direct access to their laboratory test results? An answer with many questions.” (AHRQ grant HS17820). *Journal of the American Medical Association* 306(22), pp. 2502-2503.

The U.S. Department of Health and Human Services has proposed a new rule allowing patients to access test results directly from the laboratory by request. Currently, there is a lack of consensus in the literature about best practices in direct patient notification of abnormal results. The authors of this commentary consider patient and clinician perspectives on the potential effects of this approach and lay the groundwork for issues to consider in the implementation of this proposed rule.

Groeneveld, P.W., Epstein, A.J., Yang, F., and others. (2011). “Medicare’s policy on carotid stents limited use to hospitals meeting quality guidelines yet did not hurt disadvantaged.” (AHRQ grant HS18403). *Health Affairs* 30(2), pp. 312-321.

In 2005, Medicare began covering the use of carotid stents to treat arterial blockages under an innovative policy requiring hospitals to meet quality-of-care benchmarks before seeking reimbursement. The researchers’ analysis shows that although 28-32 percent fewer hospitals offered stents than offered other types of interventional cardiovascular procedures, stents were no less available in areas with substantial poor, black, or rural populations than they were in other areas.

Guyatt, G.H., Oxman, A.D., Sultan, S., and others. (2011). “GRADE guidelines: 9. Rating up the quality of evidence.” *Journal of Clinical Epidemiology* 64, pp. 1311-1316. Reprints (AHRQ Publication No. 12-R027) are available from AHRQ.*

The authors examine the criteria for rating up the quality of evidence. The three primary reasons are: (1) when a large magnitude of effect exists, (2) when there is a dose-response gradient, and (3) when all plausible confounder or other biases increase confidence in the estimate effect. Rarely, other considerations that do not easily fit into the above categories may constitute reasons for rating up quality of evidence.

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Research briefs

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Halpern, S.D. (2011, October). “Financial incentives for research participation: Empirical questions, available answers, and the burden of further proof.” (AHRQ grant HS18406).

American Journal of the Medical Sciences 342(4), pp. 290-293.

Although paying patients and healthy volunteers for research participation is both effective and common, the practice remains controversial. The author considers the legitimate concerns about this practice, reviews the data that substantiate or repudiate these concerns, and considers the potential ethical merits of financial incentives. He concludes that the available data call into question each of the legitimate concerns and finds that restrictions on financial practices carry ethical problems of their own.

Han, H.-R., Chan, K., Song, H., and others. (2011, October). “Development and evaluation of a hypertension knowledge test for Korean hypertensive patients.” (AHRQ grant HS13160). *Journal of Clinical Hypertension* 13(10), pp. 750-757.

The researchers developed the High Blood Pressure Knowledge Test (HKT) and assessed its utility, reliability, and validity in a population of Korean Americans. Item difficulty and item discrimination were evaluated for each of the HKT’s 24 items. The researchers found that the HKT is sensitive to differences in blood pressure control status and should provide a valid, reliable, and standardized measure of high blood pressure with wide relevance.

Hernandez, A.F. and Granger, C.B. (2012, January). “Prediction is very hard. Especially about the future.” (AHRQ grant HS16964). *Archives of Internal Medicine* 172(2), pp.117-119.

Health systems have devoted increased resources to reducing readmissions following specific conditions, such as heart failure, acute myocardial infarction, and pneumonia. There is an urgent need to understand reasons for readmission and to define preventable readmissions. The authors comment on an article in the same issue that describes factors associated with 30-day readmission rates for percutaneous coronary intervention.

Hollenbeck, B.K. and Nallamotheu, B.K. (2011). “Financial incentives and the art of payment reform.” (AHRQ grant HS18726). *Journal of the American Medical Association* 306(18), pp. 2028-2030.

The authors discuss an article in the same issue that finds that physicians who provide and bill for a service (in this case, cardiac stress imaging) tend to do more of it. At issue here is the oft-debated controversy surrounding physician self-referral and its associated financial incentives, which are governed by the Stark laws. The authors argue that regulation is imperfect and that in the current era of health care reform, the focus should be less about eliminating incentives and more about getting the price right.

Huybrechts, K.F., Brookhart, M.A., Rothman, K.J., and others. (2011). “Comparison of different

approaches to confounding adjustment in a study on the association of antipsychotic medication with mortality in older nursing home patients.” (AHRQ grants HS17918, HS16097). *American Journal of Epidemiology* 174(9), pp. 1089-1099.

Selective prescribing of conventional antipsychotic medication to frailer patients is thought to have led to overestimation of the association with mortality in pharmacoepidemiologic studies relying on claims data. The authors assessed the validity of different analytic techniques to address such confounding. Their results suggest that residual confounding has a relatively small impact on the effect estimate.

Jean-Jacques, M., Persell, S.D., Hasnain-Wynia, R., and others. (2011). “The implications of using adjusted versus unadjusted methods to measure health care disparities at the practice level.” (AHRQ grant HS17163).

American Journal of Medical Quality 26(6), pp. 491-501. Simple stratified data do not allow one to assess how much of the observed differences between groups are directly related to the characteristic of interest (e.g., race) or to other confounding variables such as racial differences in health insurance or burden of illness. The authors suggest that health care organizations should consider the routine use of adjusted methods to measure disparities in order to better inform disparity-reduction initiatives.

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Research briefs

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Kozhimannil, K.B., Adams, A.S., Soumerai, S.B., and others. (2011). “New Jersey’s efforts to improve postpartum depression care did not change treatment patterns for women on Medicaid.” (AHRQ grant HS10391). *Health Affairs* 30(2), pp. 293-301.

Low-income women enrolled in State Medicaid programs may be at increased risk for developing postpartum depression. New Jersey was the first State to mandate screening for postpartum depression and also have an outreach and education campaign. This study looks at the effects of New Jersey’s mandate and campaign on postdelivery use of mental health services in Medicaid enrollees.

Li, Q., Glynn, R.J., and Dreyer, N.A. (2011). “Validity of claims-based definitions of left ventricular systolic dysfunction in Medicare patients.” (AHRQ Contract No. 290-05-0016, grant HS17731). *Pharmacoepidemiology and Drug Safety* 20, pp. 700-708.

This study evaluated the validity of claims-based definitions for systolic dysfunction (SD) and assessed misclassification bias from the claims-based definitions in two hypothetical comparative/clinical effectiveness studies. It found that claims-based definitions for SD had excellent specificity and good positive predictive value (PPV) but low sensitivity. Relatively small misclassification bias would result if definitions with good PPV could be used for cohort identification or confounding adjustment by restriction.

Ma, Y. and Mazumdar, M. (2011). “Multivariate meta-analysis: A robust approach based on the theory of U-statistic.” (AHRQ grant HS16075). *Statistics in Medicine* 30, pp. 2911-2929.

The researchers propose a new nonparametric and non-iterative method for multivariate meta-analysis on the basis of the theory of U-statistic and compare the properties of three procedures under both normal and skewed data through simulation studies. They show a marginal effect on estimates from restricted maximum likelihood because of non-normal data distribution, and that the estimates from a multivariate method of moments and U-statistic-based approaches are very similar.

McCullough, E., Sullivan, C., Banning, P., and others. (2011).

“Challenges and benefits of adding laboratory data to a mortality risk adjustment method.” (AHRQ grant HS10042). *Quality Managed Health Care* 20(40), pp. 253-262.

This study assessed the feasibility of linking separate electronic feeds of laboratory data and claims-based information and, if successful, to identify laboratory data elements that significantly improved mortality rate predictions. It found that the addition of 11 clinical laboratory test results increased the C statistic by 0.574 percent and R2 by 4.53 percent. The researchers concluded that this linkage resulted in a modest improvement in a commonly used risk of mortality tool.

McHugh, M.D., Kutney-Lee, A., Cimiotti, J.P., and others. (2011). “Nurses’ widespread dissatisfaction, burnout, and frustration with health benefits signals problems for patient care.” (AHRQ grants HS17550, HS18534). *Health Affairs* 30(2), pp. 202-210.

In order to understand burnout and job satisfaction among nurses in both patient care and non-patient care roles, the researchers analyzed a survey of over 95,000 nurses. They found that nurses in direct patient care roles in hospitals and nursing homes had much higher job dissatisfaction and burnout than nurses in other roles. Nurses were particularly dissatisfied with their health benefits. Patient satisfaction levels were lower in hospitals where more nurses were dissatisfied or burned out.

Morgan, D.J., Okeke, I.N., Laxminarayan, R., and others. (2011, September). “Non-prescription antimicrobial use worldwide: A systematic review.” (AHRQ grant HS18111). *The Lancet* 11, pp. 692-711.

This systematic review was undertaken to quantify the global frequency and effect of non-prescription antimicrobial use. The authors identified 117 relevant articles published between 1970 and 2009, including 35 community surveys from five continents showing that non-prescription drug use accounted for 19 to 100 percent of antimicrobial use outside of northern Europe and North America. Other specific issues discussed include safety, drug resistance, and anti-tuberculosis drugs.

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Research briefs

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Mutter, R.L., Rosko, M.D., Grene, W.H., and Wilson, P.W. (2011). “Translating frontiers into practice: Taking the next steps toward improving hospital efficiency.” (AHRQ Contract No. 233-08-00267P). *Medical Care Research and Review* 68, Suppl. 1, pp. 3S-19S. Reprints (AHRQ Publication No. 12-R028) are available from AHRQ.*

This article is the introduction to a special issue of this journal sponsored by the Agency for Healthcare Research and Quality. It provides an overview of the issue, the aim of which is to assess the state of the science of using frontier techniques to measure provider efficiency and to identify steps that can be taken to increase accessibility to end users. Individual articles review the contributions made using these techniques, identify where gaps remain, and offer examples of the use of frontier approaches that hold promise for the future.

Norris, S.L., Holmer, H.K., Ogden, L.A., and Burda, B.U. (2011, October). “Conflict of interest in clinical practice guideline development: A systematic review.” (AHRQ grant HS18550). *PLoS ONE* 6(10), p. e25153.

Conflict of interest (COI) is one important source of bias in the development of clinical practice guidelines (CPGs). This systematic review identified 12 studies reporting on this issue. All of the studies reported financial relationships between guideline authors and the pharmaceutical industry. However, no empirical data on the effect of COI on recommendations in CPGs was

identified.

Norris, S.L., Atkins, D., Bruening, W., and others. (2011). “Observational studies in systemic review of comparative effectiveness: AHRQ and the Effective Health Care Program.” *Journal of Clinical Epidemiology* 64, pp. 1178-1186. Reprints (AHRQ Publication No. 12-R023) are available from AHRQ.*

The Agency for Healthcare Research and Quality convened a workgroup to address the role of observational studies in comparative effectiveness reviews (CERs). It is unusual to find sufficient evidence from randomized controlled trials to answer all key questions about benefits or the balance of benefits and harms for certain medical interventions. Thus, the group concluded that the default approach for CERs should be to consider observational studies for questions of benefit or intended effects of interventions.

Rattanaumpawan, P., Tolomeo, P., Bilker, W.B., and Lautenbach, E. (2011). “A clinical prediction rule for fluoroquinolone resistance in healthcare-acquired gram-negative urinary tract infection.” (AHRQ grant HS10399). *Infection Control and Hospital Epidemiology* 32(11), pp. 1125-1126.

Development of a clinical prediction score to identify those patients who are most likely to be infected with a fluoroquinolone-resistant gram negative urinary tract infection would be useful for optimizing empirical antibiotic therapy. The researchers developed a clinical prediction rule which they believe is a promising tool and

provides the opportunity to optimize therapy for this condition.

Robinson, K.A., Saldanha, I.J., and Mckoy, N.A. (2011). “Development of a framework to identify research gaps from systematic reviews.” (AHRQ Contract No. 290-07-10061). *Journal of Clinical Epidemiology* 64, pp. 1325-1330.

The authors developed a framework to facilitate the identification and characterization of research gaps from systematic reviews. The framework provides for the classification of where, how, and why the current evidence falls short. It characterizes a gap using PICOS (population, intervention, comparison, outcomes, settings) elements. The framework then identifies the reasons why the gap exists as insufficient or imprecise information, biased information, inconsistency or unknown consistency, or not the right information.

Sawchuk, C.N., Russo, J.E., Charles, S., and others. (2011). “Does pedometer goal setting improve physical activity among native elders? Results from a randomized pilot study.” (AHRQ grant HS10854). *American Indian and Alaska Native Mental Health Research* 18(1), pp. 23-41.

The researchers conducted a pilot study using pedometers to increase walking, physical activity, and fitness levels over 6 weeks among American Indian and Alaska Native primary care patients. Outcomes included step counts, self-reported physical activity and well-being, and performance on the 6-minute walk test. Elders significantly improved on the majority of outcomes. ■

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